## REMARKS

Claims 1-13 were rejected under 35 U.S.C. §103(a) as being unpatentable over US Pat. 4,802,458 (Finsterwald et al.) in view of US Pat. 6,182,341 (Talbot et al.) Claims 1 has been amended to more clearly define the present invention.

Amended Claim 1 describes an ultrasound probe which is shielded from electronic emissions comprising an ultrasonic transducer located in a fluid chamber; a movable mechanism on which the transducer is mounted for scanning of the transducer; an acoustic window enclosing the fluid chamber through which ultrasonic energy is transmitted or received; and a conductive layer lining the acoustic window which provides electronic shielding of the fluid chamber and the transducer mechanism within the fluid chamber and which is coupled to a reference potential. Mechanical ultrasound probes in which the transducer is moving in order to scan a plane or volume are difficult to fully shield due to the transducer's motion in the fluid chamber. The present inventors have provided a probe which shields the transducer from RFI interference by using the lens cap which forms the acoustic window for both defining and enclosing the fluid chamber and for electronic shielding by means of a conductive layer lining or embedded within the lens cap. Thus, both the transducer and the fluid chamber in which the transducer moves are protected from RFI interference. A connection to reference potential rearward of the moving transducer completes the electronic shielding.

Finsterwald et al., like a probe of the present invention, scans a subject by mechanically moving the transducers in a fluid chamber. Finsterwald et al. use two single element acoustic stacks, one with a Doppler transducer 44 and another with an imaging transducer 46. For imaging the shaft-mounted transducers are driven so that the imaging transducer 46 is oscillated back and forth in front of the acoustic window formed by plastic cone 60. For Doppler measurement the transducers are rotated on the shaft so that the Doppler transducer 44 is aimed along a desired path to the point to be measured. Finsterwald et al. give no thought to RFI shielding, as the Examiner has acknowledged.

Talbot et al. describe an acoustic stack for a solid-state probe with an RFI shield layer 54. Unlike Finsterwald et al., the transducer array of Talbot et al. does not move. Thus, there is no fluid chamber in the Talbot et al. probes in which a transducer would move. Scanning is done electronically, not mechanically, by phased array electronic beam steering as stated in column 4, lines 30-35.. Without a fluid chamber, the polyurethane window 56 can be cast directly on the acoustic stack as shown in the drawings of Talbot et al. The RFI

shield layer 54 at the front of the stack provides a shield for the stack behind the shield layer. The layer provides no shielding in front of the stack or of the nose piece 58 surrounding the stack. RFI interference can still enter the probe through the window and around the stack 52 through the nose piece 58. The shield layer 54 is coupled to ground by ground flex circuits of the stack.

It is seen that neither Finsterwald et al. nor Talbot et al. provide RFI shielding of a fluid chamber or a moving transducer within a fluid chamber. Finsterwald et al. gives no thought to the problem and Talbot et al. does not have the problem to consider. If one skilled in the art were to apply the shielded acoustic stack of Talbot et al. to Finsterwald et al, that is exactly what they would do. The imaging and Doppler stacks 44 and 46 would each have an RFI shield layer 54 on top of the stack, which is what Talbot et al. teaches. As the Examiner states, "Talbot et al. disclose the conductive layer "shield substructure" is on top of the acoustic stack...." This would still leave the fluid chamber in which the transducers move fully exposed to RFI interference. The combination lacks the insight of the present inventors which is to line the acoustic window which contains the fluid chamber with an RFI-shielding conductive layer to provide RFI shielding of the full chamber including the transducer mechanism within it. The acoustic window of the claimed invention thus serves two purposes, enclosing the fluid chamber and providing RFI shielding for the fluid chamber and the transducer mechanism within it. It is therefore respectfully submitted that Finsterwald et al. and Talbot et al. cannot be combined to render Claim 1 unpatentable. The remaining claims all depend from Claim 1 and are patentable over these two patents by reason of this dependency.

Claim 14 was rejected under 35 U.S.C. §103(a) as being unpatentable over Finsterwald et al. in view of Talbot et al. and further in view of U.S. Pat. 5,311,095 (Smith et al.) Smith et al. was cited for its showing of a conductive layer 10 with a thickness of less than one-quarter of a wavelength. Like Talbot et al., Smith et al. is not describing a mechanical probe and has no fluid chamber. Claim 14 specifies a thickness for the conductive shielding layer of 1/16 of a wavelength so that the layer will be transparent to ultrasound and pass it unimpeded as described on page 6 of the present application. The layer 10 of Smith et al. does exactly the opposite. Column 4 of Smith et al. describes the layer 10 as a "mismatching layer" which "prevents acoustic transmission into the ceramic backing." The mismatching layer 10 will reflect ultrasound from the piezoelectric elements back to the elements rather than allow the energy to be matched to and pass into the backing. It is respectfully submitted that one skilled in the art would not look to Smith et al. to

determine a thickness for the shielding layer of the present invention, since the shielding lens cap must pass ultrasound energy in both directions (during transmission and reception), not pose an acoustic mismatch which reflects the energy back to its source. In addition to the dependency of Claim 14, the combination of Finsterwald et al., Talbot et al. and Smith et al. cannot render Claim 14 unpatentable for this further reason.

Claim 15 was rejected under 35 U.S.C. §103(a) as being unpatentable over Finsterwald et al. in view of Talbot et al. and further in view of U.S. Pat. 5,488,954 (Sleva et al.) Sleva et al. was cited for its disclosure of a 1000 Angstrom aluminum layer in an ultrasound probe, as Claim 15 recites that the shielding layer of a probe of the present invention can have a thickness of 1000-3000 Angstroms. Like Talbot et al., Smith et al. is not describing a mechanical probe and has no fluid chamber. However it is seen that the layers referenced in Sleva et al. are the conductive layers 12 and 16 for the piezoelectric layer 16 of a semiconductor transducer. The transducer in Sleva et al. is made by a semiconductor deposition process and the conductive layers 12 and 16 are the two electrodes which drive and receive from the piezoelectric layer 14 of their transducer. The electrode layers 12 and 16 play the same role in the Sleva et al. transducer as the conductors 10 and 40 do in Smith et al. They are for driving and receiving signals from the piezoelectric material. They have nothing to do with RFI shielding and would not commend themselves to one skilled in the art who is considering that problem. In addition to the dependency of Claim 15, it is respectfully submitted that the combination of Finsterwald et al., Talbot et al. and Sleva et al. cannot render Claim 15 unpatentable for this further reason.

The specification has been amended by updating the serial numbers of concurrently filed applications.

In view of the forgoing amendment and remarks, it is respectfully submitted that Claims 1-13 are patentable over Finsterwald et al. and Talbot et al., that Claim 14 is patentable over Finsterwald et al., Talbot et al. and Smith et al., and that Claim 15 is patentable over Finsterwald et al., Talbot et al. and Sleva et al. Accordingly it is respectfully requested that the rejection of Claims 1-15 under 35 U.S.C. §103(a) be withdrawn.

In light of the foregoing amendment and remarks, it is respectfully submitted that this application is now in condition for allowance. Favorable reconsideration is respectfully requested.

Respectfully submitted,

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